

# CA Agencies

- CA-DTSC
  - New VI Guidance (10/2011) & Soil Gas Advisory (4/2012)
- EPA Region 9
  - Adopted Region 3 Screening Levels for TCE & PCE
- SF-RWQCB
  - ESLs still not updated from June 2011
- OEHHA
  - Still using out-dated CHHSLs (pre RAGS Part F)
- San Diego DEH
  - Soil gas sampling & analysis updated in SAM Manual

SWQCB: Low Threat Closure Policy

# DTSC VI Guidance Changes

- Preference for Sub-slab Samples for Cl-VOCs
- Collect Exterior SG Samples At Source
- Repeated Sampling of Soil Gas
- Raising Sub-slab AF to 0.05 (5x stricter)
- Can now measure permeability, diffusivity and radon for attenuation factor
- Changes in Toxicity of Some Compounds

Defers to LUFT Manual for Petroleum HCs (p.38)

# New TCE Standard

(As of October 2011)

- Residential (1e-6)
  - Indoor Air cancer: 0.43 ug/m<sup>3</sup> (down from 1.2 ug/m<sup>3</sup>)
  - Indoor Air non-cancer: 2.1 ug/m<sup>3</sup>
  - Groundwater: 1.1 ug/L
- Commercial/Industrial (1e-6)
  - Indoor Air: 3.0 ug/m<sup>3</sup> (down from 6.1 ug/m<sup>3</sup>)
  - Indoor Air non-cancer: 8.8 ug/m<sup>3</sup>
  - Groundwater: 7.4 ug/L

EPA R9 & DTSC Have Adopted  
OEHHA Has Not Adopted C/I

# New PCE Standard

(As of March 2012)

- Residential ( $1e-6$ )
  - Indoor Air cancer: 9.4 ug/m<sup>3</sup> (up from 0.41 ~22x !!)
  - Indoor Air non-cancer: ~47 ug/m<sup>3</sup>
- Industrial ( $1e-6$ )
  - Indoor Air: ~47 ug/m<sup>3</sup> (up 22x)
  - Indoor Air non-cancer: 8.8 ug/m<sup>3</sup>

EPA R9 Has Adopted  
DTSC & OEHHA Have Not Adopted Either!

# Soil Gas Allowed Levels

## PCE in Soil Gas, Residential Receptor

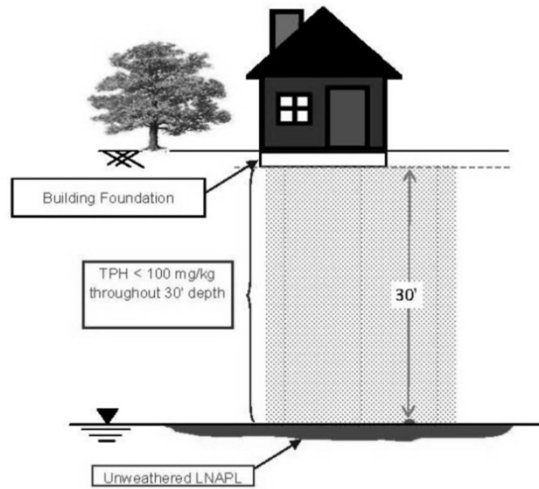
	RBSL (ug/m <sup>3</sup> )
DTSC Sub-slab	8.2
CHHSL	180
DTSC – Step 5	205
EPA R9	4,700
SAM Vapor Risk	5,500

# DTSC Soil Gas Advisory Changes

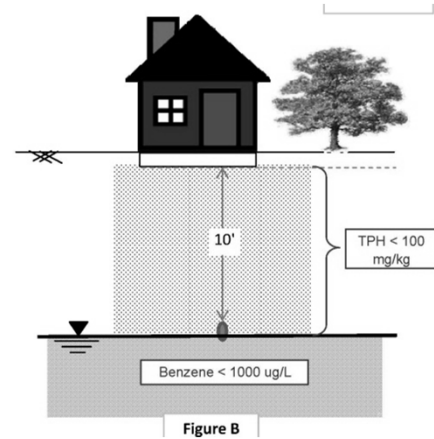
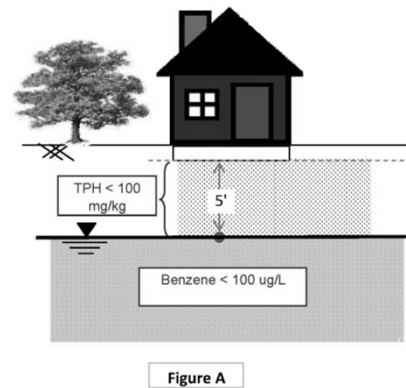
- Sampling
  - Purge volumes: include dry bentonite
  - Equilibration times: 2 hours for tubes
  - Leak check specifications: report at VOC RL
- Analysis
  - Methods 8021, 8260, TO-14, TO-15, TO-17 ok
  - Naphthalene preferred by TO-17
  - Syringes & tedlar bags ok to use (in lieu of canisters)

Detailed Seminar by H&P on 9/25/2012

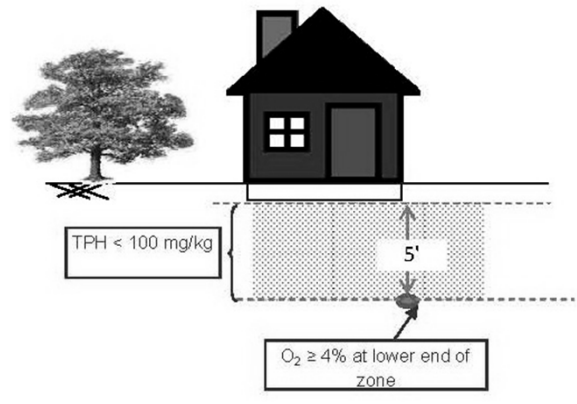
# Low Threat Closure Policy VI Scenarios



**LNAPL: 30'**



**Dissolved: 5' or 10'**



**Dissolved with O<sub>2</sub>**

# Low-Threat Closure Policy

## Site Screens Out from VI Pathway if:

- If 30' of Biozone, NAPL screens out
  - Vertically & horizontally
- If 10' of Biozone, benzene up to 1000 ug/L
- If 5' of Biozone, benzene up to 100 ug/L

Bioattenuation zone: TPH-soil < 100 mg/kg

Note: O<sub>2</sub> not Required



# Low-Threat Closure Policy

## The Power of Oxygen

**If oxygen in soil gas >4%:**

- Separation distance drops from 10' to 5' for benzene up to 1000 ug/L
- Soil gas SLs increase by 1000x!

TPH-soil required for all scenarios but O<sub>2</sub> not

# Allowable Benzene in GW

## 1e-6 risk, Residential Scenario

- DTSC VI Guidance:

$$0.084 \text{ ug/m}^3 / 0.002 = 0.42 \text{ ug/L} / 0.2 = 0.21 \text{ ug/L}$$

~5000x lower than Low Threat Value of 1000 ug/L

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- New EPA OSWER Guidance:

$$0.31 \text{ ug/m}^3 / 0.001 = 0.31 \text{ ug/L} / 0.2 = 1.5 \text{ ug/L}$$

~3000 times lower than EPA-OUST Value!!

# Soil Gas Allowed Levels

Benzene in Soil Gas, Residential Receptor, 1-6 Risk

	RBSL (ug/m <sup>3</sup> )
DTSC Sub-slab	1.6
CHHSL	37
DTSC – Step 5	42
CA Low-Risk Policy: O <sub>2</sub> <4%	85
SAM Vapor Risk	1,100
CA Low-Risk Policy: O <sub>2</sub> >4%	85,000

Ambient levels: 1 to 10 ug/m<sup>3</sup>

# Low-Threat Policy: A VI Pathway Game Changer

- Active Service Stations Excluded
- Sampling
  - Soil phase TPH needed from two depths
  - O<sub>2</sub> in soil gas
- Soil Gas Analysis
  - Needed at all?
  - Benzene, ethylbenzene & naphthalene only
  - No longer worry about TPH??

VI Assessments Much Simpler & Less Expensive

# Most Common VI Bloopers

- Unit Confusion
  - Assuming ug/L equivalent to ppbv
  - Assuming ug/m<sup>3</sup> equivalent to ppbv
- Screening Levels
  - Comparing to generic screening levels
  - Not calculating correct levels
- Sampling & Analysis Errors
  - Program design: soil gas? GW? SS? IA?
  - Using wrong hardware
  - Using wrong analysis

# Forthcoming VI Events

- H&P Seminar on new DTSC Guidances & Low-Threat Closure Policy: Irvine, 9/25/12
- AWMA VI Conference – Denver: Oct 3 & 4
- AEHS Conf – San Diego: March 18, 2013
  - EPA all day workshop
  - Petroleum VI all day presentations
  - Half-day session on non-petroleum VI